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THE
AGRICULTURAL LEDGER.

1895—No. 16.

MANURES AND MANURING.

(NIGHT-SOIL.)

[DICTIONARY OF ECONOMIC PRODUCTS, Vol. V., M. 239.]

THE DISPOSAL OF NIGHT-SOIL:

Note by DR. J. W. LEATHER, Agricultural Chemist to the Government of India.



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The objects of THE AGRICULTURAL LEDGER are—

- (1) To provide information connected with agriculture or with economic products in a form which will admit of its ready transfer to ledgers;
- (2) To secure the maintenance of uniform ledgers (on the plan of the Dictionary) in all offices concerned in agricultural subjects throughout India, so that references to ledger entries made in any report or publication may be readily utilised in all offices where ledgers are kept;
- (3) To admit of the circulation, in convenient form, of information on any subject connected with agriculture or economic products to officials or other persons interested therein;
- (4) To secure a connection between all papers of interest published on subjects relating to economic products and the official Dictionary of Economic Products. With this object the information published in these ledgers will uniformly be given under the name and number of the Dictionary article which they more especially amplify. When the subject dealt with has not been taken up in the Dictionary, the position it very possibly would occupy in future issues of that work will be assigned to it.

E. C. BUCK,
Secretary to the Government of India.

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[*Dictionary of Economic Products, Vol. V., M. 239.*]

THE DISPOSAL OF NIGHT-SOIL:

A Note by Dr. J. W. LEATHER, Agricultural Chemist to the Government of India.

There is perhaps no more important subject, in relation to agriculture, than the proper disposal of night-soil and other town-refuse, for it may be said, without exaggeration, that nearly one half of the plant food extracted by food-crops from the soil, is contained in the materials which are included under these two heads. It follows, therefore, that on their proper disposal and return to the soil, depends the addition of a large proportion of the food necessary for the crops.

2. In the case of small villages in India generally, the usual customs of the people in a great measure fulfil what is required. At the same time, it would appear that there are exceptions even to this practice in some places. For instance, Mr. Nicholson, in his Manual of Coimbatore, says (page 193) : "But, generally speaking, the lanes and hedges around houses are fouled with matter in its wrong place, and the chief manurial agent becomes a curse for want of employment."

In any case, in reference to the custom of the people of using the fields next to the village the sites, there can be no doubt that it would be a great improvement, from a sanitary point of view, if the people could be persuaded to employ a covering of earth. The desirability of this will have been observed by all who have had occasion to visit villages.

But in the case of the large towns a more systematic disposal of both night-soil and sweepings is necessary. Dr. Voelcker, at page 119 of his Report on the Improvement of Indian Agriculture, says :—"I regard the spread of a good system of utilising human and household refuse, street-sweepings, etc., on the land, as a most potent factor in the improvement of Indian agriculture, and having had, among other duties, to enquire

Value of
night-soil.

Waste in
many places.

Disposal of
city-refuse.

MANURES

The Disposal

Present practice of disposing of city-refuse.

into different schemes for town sanitation, I must record my conviction that the dry system is the one best suited to Indian circumstances, and that any system which diverts from its proper destination, the land, that which has originally come from it, would be attended by loss to the cultivator and to the State, and would not be satisfactory from a sanitary point of view."

3. The practice in some places consists in depositing all refuse in large pits about 3 feet deep and of considerable area, and after the whole has been thus filled in, crops or fruit-trees are grown on the land. This practice I found in existence at Dumraon, for example. The objection to it is that the refuse might be advantageously spread over considerably greater areas.

Trenching.

Another system consists in digging long trenches about 6 inches or 1 foot deep and a foot wide and filling them in with 3 to 6 inches of refuse and then covering over with the earth which has been removed. This has been done at jail gardens among other places. It is undoubtedly a good method, but even here there is a great concentration of the material, and it has been found in some instances that, owing to carelessness in putting more than the proper amount of night-soil in at one place, the earth thrown over the surface has been insufficient to properly deodorise the refuse.

For example, at the Allahabad Grass Farm, where the system has been carried on for some years, this defect has been apparent as will be seen from the letter from the Medical Officer of Allahabad District, which is given *in extenso* in paragraph 4.

Poudrette.

Another method is that of preparing "Poudrette" from the town refuse.

The practice at Nagpore, in the Central Provinces, is to fill night-soil and town-sweepings into pits measuring 10 feet by 4 feet and 4 feet deep into which about 100 cubic feet of sewage is emptied in 10 or 12 portions, 3 or 4 inches of earth being thrown over each layer.

At Poona a similar practice prevails, the pits there being 18 feet by 15 feet and only 1 foot deep. Ashes are spread over the night-soil.

A similar system prevails at Cawnpur.

After a time the material becomes dry and nearly odourless and is taken out of the pits and sold for manure.

Regarding the chemical composition of such poudrette, it will be evident that this will depend on the proportion of earth which is mixed with the refuse, and secondly, on the comparative dryness or wetness of the material when taken out of the pits. The larger the proportion of earth and the wetter the condition of the material, the smaller will be the percentage of plant-food ingredients, such as phosphoric acid and nitrogen.

The following analyses of samples of poudrette which have been made by the writer, may be quoted:—

	Poudrette from Cawnpur.	Poudrette from Poona.
Moisture	2.64	22.91
Organic matter	7.81	15.11
Earthly substance	89.51	68.09
	100.00	100.00
Containing		
Nitrogen	0.428	0.376
Phosphoric Acid	0.417	0.366

4. It must, I think, be admitted that there is no advantage in the systematic disposal of night-soil, if it can be distributed over a large area and

of Night-soil. (*J. W. Leather.*) AND MANURING.

not concentrated unnecessarily in one place, and it is also an advantage if the system employed does not necessitate its removal after it has once been deposited in the soil.

Regarding the first desideratum, it is not only advantageous from the agricultural point of view, to manure as large an area as may be, but it must also be remembered that the de-odorising and oxidising power of the soil is not unlimited, and that if more than a certain amount of refuse is mixed with earth, these qualities of the latter become nullified for a time at least, and the object of mixing earth with the material at all is in a measure not attained.

Thus it happens that in both the trench and pit systems, objection has been taken to them by some, because they have become a source of constant odours. The men employed mix as little earth as they are allowed to do, because it is this part of the work that entails the most labour,

Perhaps the most recent method which has been introduced for the disposal of night-soil is one which is described in paragraph 3 of the following letter from the Medical Officer of the Allahabad District and which is published as an Appendix to the Report on the Allahabad Grass Farm for the year 1892-93:—

"Having repeatedly inspected the portion of the Grass Farm near the Macpherson Park and New Cemetery, which is being used for the disposal of the filth from the latrines in the New Cantonment, and having been much impressed with the superiority of the method there adopted over the regulation trench system, I am anxious to bring the matter to the notice of the General Officer Commanding with a view to its being more generally known and adopted.

"2. According to regulation the trenches are to be dug 1 foot wide 6 inches deep, of which 3 inches are to be filled in with filth and 3 inches with pure earth on top. From experience, however, I can say that the *beldars* usually dig the trenches much deeper, and to save themselves trouble fill the trenches with filth, and when earth is thrown on it some comes to the top and causes a smell.

"3. At the Allahabad Grass Farm the following system devised by **Conductor Meagher** has been found to answer best. For the contents of each filth cart, a rectangular space 14' x 5' is taken and the top soil scraped off to the edges to a depth of about 3 inches. The soil at the bottom of the space is then loosened and pulverised to a depth of 6 inches or 7 inches.

"The shallow trench having been thus prepared, the contents of the filth carts (Crowley pattern) are tipped into it. If the bottom soil has been well pulverised, the fluid portion soaks into it quickly, leaving a thin stratum of the solids on the top, which is now covered over with the 3 inches of earth first removed. The shallow trenches are prepared in succession leaving a space of about 4 inches between them.

"4. Intelligent and careful supervision is essential to the success of this as well as of any other system, and the Grass Farm finds it profitable to give a small extra allowance to the *beldars* and European overseers to encourage them to devote more time and trouble to the work than they otherwise would,

"5. I have personally observed that in one of these shallow trenches dug up in dry weather, after about a fortnight or three weeks, no trace of the solid portion of the refuse was noticeable, and that after about two months the earth so dug up was free from smell.

"At my visit on 14th August I found a splendid crop of millet, with an under-crop of grass growing on the site I saw used for burying filth on 5th June. On the site which I saw used about a month ago, a vigorous young crop of millet was coming on. Conductor Meagher informed me that he had not found it necessary to plough these sites. He had the millet and grass seeds scattered on top and some earth sprinkled over them.

"In an adjoining portion of ground the old deep-trench system had been used, and I had some of them, in which the filth had been buried over twelve months, dug up, with the result that the solid portion of the filth could still be distinctly recognised by its black colour, showing that it had not been completely decomposed.

Incomplete
de-odori-
zation.

Medical
report.

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The Disposal of Night-soil.

Allahabad
system.

"At the time of my visit (14th instant) grass was growing over the site of these deep trenches, but not so luxuriantly as on the other sites, and Mr. Meagher informed me that, according to his experience, horses will not eat the first crop of grass grown when the old system was employed, whereas they do not object to first crops from the land treated according to the new plan."

It will be observed that the night-soil is spread over a much larger area than is the case in the trench system, whilst it has the advantage that it does not necessitate the after-removal of the material as is the case with poudrette.

Regarding the rapidity with which the earth becomes de-odorised, the writer can entirely substantiate what Colonel Martin says.

The only possible drawback to the method lies in the much larger area required for the disposal of the night-soil. But there can be little doubt that, if cultivators once placed their land at the disposal of Municipal Bodies for the purpose (roughly speaking), the land would be required for six months) they would readily do so again and probably pay something as a premium.

The land at Allahabad which has been so treated, shows the effects of the manuring for a number of years afterwards.

Native
prejudice.

5. It is doubtless the case that prejudice exists in some parts of India against the use of night-soil. Dr. Voelcker thus refers to the point :—

"Prejudice is the great bar to the proper utilisation of night-soil. It is not that its value is not known, as the appearance of fields nearest to any village will testify, for the growing of a tall crop, such as *arhar* (*Cajanus indicus*) is frequently a direct indication that that particular field has come to its turn for receiving manure. On these fields the crops are manifestly better than the rest; what is wanted is, greater distribution of these fields. The hope for improvement lies in the gradual breaking down of prejudice. That there are signs of this going on is evidenced by the fact that in certain towns, such as Farukhabad, Cawnpore, and Nagpore, the utilisation of night-soil has had an indigenous origin, and its spread has been due to other cultivators following the example set. It will be, on the one hand, by the force of example, and by the necessity of adopting the most remunerative methods, and, on the other hand, by the breaking down of prejudice through the spread of education, that, by degrees, the ready and natural means of replenishing the land by the use of night-soil will come into general use."

Whether this prejudice is only against the handling of night-soil or not, the writer has as yet not satisfied himself. In the case of the method lately introduced at Allahabad the material is handled only by the scavengers, who cart it out to the land.

That there are degrees of prejudice cannot be doubted. For instance at Allahabad the people will not allow a bullock to draw the night-soil carts and only buffaloes are employed for the work, whereas, at Nagpore, bullocks are regularly employed.

And similarly at both Poona and Nagpore the people were averse to the use of poudrette at first, but are now more than willing to pay for it. It is actually at a premium.

The importance, however, of the systematic disposal of both sweepings and night-soil in the case of towns cannot be doubted, both from the agricultural, as well as from the sanitary, point of view.

All communications regarding THE AGRICULTURAL LEDGER should be addressed to the Editor, Dr. George Watt, Reporter on Economic Products to the Government of India, Calcutta.

The objects of this publication (as already stated) are to gradually develop and perfect our knowledge of Indian Agricultural and Economic questions. Contributions or corrections and additions will therefore be most welcome.

In order to preserve a necessary relation to the various Departments of Government, contributions will be classified and numbered under certain series. Thus, for example, papers on Veterinary subjects will be registered under the Veterinary Series; those on Forestry in the Forest Series. Papers of more direct Agricultural or Industrial interest will be grouped according as the products dealt with belong to the Vegetable or Animal Kingdom. In a like manner, contributions on Mineral and Metallic subjects will be registered under the Mineral Series,

This sheet and the title-page may be removed when the subject-matter is filed in its proper place, according to the letter and number shown at the bottom of each page.